Incardone, Gia G

From: Cote, Mike - Middlebury, CT
Sent: Tuesday, May 23, 2006 5:23 PM
To: 'Tom Biksey'
Subject: RE: Sistersville PCB Phase II workplan
Attachments: msc comments Phase II PCB Characterization WP.doc

Hi Tom

Some redline comments regarding the workplan are attached. Once you've had a chance to look at them, please give me a call. Thanks.

Mike Cote

Chemtura Corporation

203-573-3545

From: Tom Biksey [mailto:tbiksey@escpa.com]
Sent: Tuesday, May 09, 2006 5:20 PM
To: Michael.Cote@chemtura.com
Subject: Sistersville PCB Phase II workplan

Mike,

Attached is the draft Phase II workplan and figures. I have sent a doc file so that you can track changes. If you need hardcopy, please let me know and I will send them out tomorrow.

Smooth seas and fair winds,

Tom

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DRAFT

PHASE II PCB CHARACTERIZATION WORKPLAN
GE SILICONES, LLC PLANT
FRIENDLY, WEST VIRGINIA

PREPARED FOR

CHEMTURA CORPORATION

PREPARED

BY

ENVIRONMENTAL STRATEGIES CONSULTING LLC

MAY 9, 2006

A T TECHNICAL SERVICES

CHEM001022

Contents

1.0 Introduction

1.1 General

Environmental Strategies Consulting LLC, on behalf of Chemtura Corporation, has prepared this Phase II polychlorinated biphenyls (PCBs) characterization workplan for the former Crompton OSi Specialties Group Sistersville facility located at 3500 South State Route 2 near Friendly, Tyler County, West Virginia (Figure 1). The facility was acquired by General Electric Silicones, LLC, (GE) on July 31, 2003, as part of the overall purchase of the OSi business from Chemtura.

In May 2003, ENVIRON International Corporation (ENVIRON) completed a Phase II subsurface investigation of soil, groundwater, and sediment for GE before the sale of the facility to GE (ENVIRON 2004). During the Phase II investigation, ENVIRON discovered two areas within the former Crompton facility that had soil samples with PCB concentrations that exceeded the Toxic Substances Control Act (TSCA) self-implementing cleanup level for low occupancy areas of 25 milligrams per kilogram (mg/kg). These areas were referred to as the former Waste Incineration Area (SB-71) and the Permitted Hazardous Waste Storage Area (SB-67 and SB-74). There were no concentrations of PCBs that exceeded 25 mg/kg at depths below four feet.

Additionally, during August 2005, ENVIRON performed additional characterization near SB-67 due to excavation that was being performed to repair subsurface piping. Based on this additional characterization, two areas (E-13 and E-7) were identified with concentrations of PCBs above the TCSA criterion. E-13 was collected from the general location of SB-67. The sample collected at E-7 (from an area of staining) was above the TSCA self-implementing cleanup level for low occupancy areas of 25 mg/kg.

In December 2005, Environmental Strategies conducted a Phase I PCB characterization to evaluate the areas identified by both the ENVIRON Phase II investigation (ENVIRON 2004) and post-excavation sampling performed in August 2005 (ENVIRON 2005). The Phase I characterization was performed in accordance with the PCB Characterization Workplan (Environmental Strategies 2005) and the results are presented in the PCB Characterization Report (Environmental Strategies 2006).

The samples collected from the accessible locations on grids placed around the SB-67 and SB-74 sample locations that had PCB concentrations above the TSCA criterion during the

Phase I characterization did not exceed the TSCA criterion (Figure 2). This indicates that the horizontal extent of the soil containing PCBs above the TSCA criterion is not beyond these samples. Because of access restrictions due to overhead lines, underground lines, and physical obstructions, the extent of the soil containing PCBs above the TSCA criterion at and immediately surrounding ENVIRON samples SB-67 and E-7 has not been defined. Therefore, Environmental Strategies recommends removal of the soil in the SB-67 and E-7 areas, and collection of confirmation samples. No further action is warranted at the SB-74 area because the soil sample located at ENVIRON sample SB-74 did not have a concentration of PCB in the surface or subsurface that exceeds the TSCA criterion. In addition, soil samples located to the north and west of SB-74 also did not have concentrations of PCBs that exceed the TSCA criterion. The areas south and east of SB-74 were either covered by concrete slab or steel plating, or were restricted due to the presence of utilities.

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During the Phase I characterization activities, Environmental Strategies confirmed that soil in the area surrounding SB-71 has PCB concentrations that exceed the TSCA criterion. The PCB concentrations for 35 of the 50 samples (surface and subsurface) collected from the grid around SB-71 exceeded the TSCA criterion. For the 25 sample locations, only 3 had concentrations of PCBs that did not exceed the TSCA criterion in the surface or subsurface sample. Based on the concentrations of PCBs detected in the SB-71 area (Figure 3), further delineation is warranted to identify the horizontal extent of soil containing PCBs at concentrations above the TSCA criterion.

Comment [C1]: Are we satisfied with the vertical definition?

This workplan describes the Phase II activities to be implemented to further characterize the extent of soil containing PCBs at concentrations above the TSCA criterion in the former Waste Incineration Area (SB-71) and the Permitted Hazardous Waste Storage Area (SB-67 and E-7). The workplan will be conducted in accordance with the TSCA Part 40 of the Code of Federal Regulations (CFR), Part 761.61, for characterization of potential PCB affected sites.

1.2 Site Description

The facility is located at 3500 South State Route 2 near Friendly, Tyler County, West Virginia. The facility is situated on approximately 1,300 acres in a relatively rural area adjacent to the Ohio River (at approximately River Mile 15). The footprint of the main production area

comprises approximately 50 acres (Figure 1). A detailed site history and description is presented in the Phase II Investigation prepared by ENVIRON (2004).

1.3 Scope of Work

This workplan describes the activities to be implemented during the Phase II investigation at the facility and designates the procedures and protocols to be used during the site characterization activities. The Phase II PCB characterization will include:

- Coordination with the regulatory agency
- removal of soil in the SB-67 area and E-7 area and collection of confirmation samples
- soil characterization to delineate the horizontal extent of PCBs in soil at the SB-71 area and
- data evaluation and analysis, and recommendations for additional characterization or remedial activities, if warranted.

All site activities, including note taking, sample collection and handling, decontamination, and quality assurance procedures, will be performed in accordance with Environmental Strategies' standard operating procedures (SOPs) presented as Appendix A.

2.0 Phase II Activities

2.1 Regulatory Agency Coordination

Chemtura and Environmental Strategies will attend a meeting with the U.S. Environmental Protection Agency (EPA) Region 3 PCB Program Coordinator before implementing the Phase II workplan. The purpose of the meeting is to update the Region 3 PCB Program Coordinator on the Phase I characterization performed in December 2005 and present the proposed workplan for the Phase II characterization. Environmental Strategies will incorporate comments made by the Region 3 PCB Program Coordinator during this meeting in a supplement to the workplan.

2.2 Soil Sampling Procedure

In the SB-71 area, additional samples will be collected utilizing a sampling grid network that will extend out from the limits of the original Phase I sampling grid to delineate the extent of PCB affected soil. Soils located in the SB-67 area and E-7 area will be excavated, and confirmation samples will be collected to confirm that the concentration of PCBs remaining in the soil is below the TSCA criterion. The following provides details of the procedures for each of these areas.

Environmental Strategies recommends removing the soil in the area surrounding SB-67 and E-7 by vacuum or hand excavation because of the utilities present in the area that prevented sampling in Phase I using direct-push technology. After the excavation, confirmation samples will be collected from the floor and sidewalls of the excavated area to confirm that the remaining soil contains PCBs at concentrations below the TSCA criterion. It is estimated that the initial excavation will be approximately four feet wide by four feet long and approximately two feet deep for the SB-67 area, and approximately five feet wide by five feet long and approximately five feet deep for the E-7 area (Figure 2). The excavated material will be characterized and disposed of in an approved TSCA landfill.

Based on the concentrations of PCBs detected in the SB-71 area (Figure 3), further delineation is warranted to identify the horizontal extent of the soil containing PCBs at concentrations above the TSCA criterion. The proposed grid pattern for the SB-71 area is shown on Figure 3, with sampling locations at 25-foot grid intersections (versus the 15-foot grid in

Comment [C2]: Add a key to figure 3 please. I presume the primary samples are circles and the secondary triangles.

Comment [C3]: Satisfied with vertical delineation?

Phase I). Based on the previous sampling results, at this time a larger grid-intersection length is recommended to delineate the potentially affected soil in the SB-71 area. A total of 16 locations will be sampled from the intersection points located adjacent to the Phase I sampling locations. These samples will be designated as primary sample locations. Samples collected at the edge or corner of the grid will be designated as secondary sample locations. Using the same approach as in the Phase I, samples will be collected from each grid point from 0 to 0.5 feet beneath surface cover or gravel, if present, using direct-push technology. An additional sample from each location will be collected from 0.5 to 1.5 feet below the surface sample. The primary samples will be submitted to the laboratory to be analyzed immediately. The secondary samples will be submitted to the laboratory, the initial extraction will be completed, and the samples will be archived pending the results of the primary samples.

Deleted: Because the presence of PCBs in the soils appears extensive,

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As in Phase I, field conditions may require modification of the sampling point locations. A valid grid intersection sampling point will be defined as located on soil (including gravel) or asphalt. Each sample locations that is covered by concrete slab steel plating, or where other access restrictions prohibit sampling, will be considered an invalid sampling location. However, if an invalid grid intersection point is within approximately two feet of a valid sampling point, the location will be modified by moving to the nearest valid sampling point.

Comment [C4]: Please add a statement about how samples will be located so that they can be reproduced later.

After sample collection, the soil and sample location will be characterized and logged in the field book. The samples will be placed in a cooler with wet ice and chilled to 4° Celsius. Holding times will not exceed the times recommended by the appropriate EPA analytical methodology. A chain of custody form will be completed and the samples will be delivered to the analytical laboratory for subsequent analysis.

2.3 Analytical Methods

The SB-71 soil samples will be submitted for laboratory analysis of PCBs by EPA Method SW-846 8082, and approximately 25 percent of the samples will also be analyzed for total organic carbon (TOC). In addition, five percent of the samples will be collected as blind duplicate samples, and will be submitted for laboratory analysis for quality assurance/quality control (QA/QC) purposes. A field blank sample will be collected at a rate of one per day. The samples will be analyzed by a West Virginia certified laboratory.

Based on the analytical results for the primary samples, the secondary samples may be analyzed using the same analytical method as the primary samples. If a primary sample has a PCB concentration that exceeds the TSCA criterion, any adjacent secondary samples will be submitted for laboratory analysis. The secondary samples will also be analyzed for TOC and QA/QC purposes at the same frequency as the primary samples.

The SB-67 and E-7 confirmation samples will be submitted for laboratory analysis of PCBs by EPA Method SW-846 8082. In addition, five percent of the samples will be collected as blind duplicate samples, and will be submitted for laboratory analysis for QA/QC purposes. The confirmation samples will be submitted for 24-hour analysis.

3.0 Health and Safety

Before initiating field activities, a site-specific Health and Safety Plan will be prepared by Environmental Strategies in accordance with 29 CFR 1910.120. The Health and Safety Plan will identify Environmental Strategies' personnel responsible for implementing health and safety procedures at the site and a list of contacts in the event of an emergency. The plan will also identify potential physical and chemical hazards at the site. Additional information to be included in the plan include personal protective equipment, monitoring requirements, decontamination procedures, site controls and access restrictions, communication procedures, emergency procedures, route to the nearest medical center, and training requirements for site personnel.

All personnel involved in field activities will be required to have OSHA 40-hour training (and updated refresher training), and to have background checks as required by GE contractor procedures. The site field supervisor will attend the GE contractor health and safety training, and then will be responsible for training all field team members.

4.0 Data Evaluation and Recommendations

Environmental Strategies will evaluate the results of the SB-71 soil characterization activities, including the analytical results of the primary and any secondary samples submitted for laboratory analysis. If the analytical results indicate that the TSCA criterion is not exceeded in any of the soil samples analyzed, Environmental Strategies will recommend documenting the activities completed during this phase of the PCB characterization project, including characterization of the sample locations, sampling results, and data quality assurance review, in a summary report. If the sample analytical results indicate that the TSCA criterion was exceeded, Environmental Strategies will make recommendations for additional investigation activities or a remedial action, if warranted.

The SB-67 and E-7 confirmation samples will be evaluated during the field activities. If the analytical results indicate that the TSCA criterion is not exceeded in any of the soil confirmation samples analyzed, Environmental Strategies will recommend documenting the activities completed during this phase of the PCB characterization project, including characterization of sample locations, sampling results, and data quality assurance review, in a summary report. If the sample analytical results indicate that the TSCA criterion is exceeded, Environmental Strategies will make recommendations for additional investigation activities or a remedial action, if warranted, to Chemtura. Based on the proposed additional field activities, the work either will be continued during this phase of the PCB characterization project, or will be implemented in a later phase.

Comment [C5]: EPA Approval is not a component of this timeline. If we're really going to seek approval, do you think that it should be at least mentioned?

5.0 Project Schedule

The proposed schedule for completing the tasks in this workplan is based on our current understanding of the work to be completed within the logistical requirements of working at the GE facility. The workplan will be submitted to GE for review and comment, and to provide verification and final clearance of the location of the utilities on the proposed sampling figures. The initiation of the field sampling program is contingent on GE's clearance of the utilities.

Phase II activities at the SB-67 area and E-7 area will be conducted before the characterization at the SB-71 area. The confirmation samples from the SB-67 area and E-7 area will be analyzed while the characterization at SB-71 area is being performed. This will allow time for the laboratory analysis of the confirmation sampling to be completed. If any of the initial confirmation samples fail to meet the TSCA criterion, additional excavation and confirmation sampling may be performed, as discussed in the data evaluation section of this workplan.

Field sampling of the SB-71 area, and completion of field excavation and sampling at the SB-67 area and E-7 area will be completed within six weeks of GE's concurrence with the workplan. This time period includes setting up the grid pattern for SB-71 in the field, and final utility clearance of the proposed sampling locations for all sampling areas on the first day of the field sampling program. Primary sampling results for the SB-71 area are expected within three weeks of submittal for laboratory analysis based on standard turnaround time of 15 business days. If secondary samples are submitted for analysis, this time period will be extended. Confirmation sampling results for the SB-67 area and E-7 area are expected within 24 hours of receipt by the laboratory. Data evaluation and recommendations will be completed within two weeks of the receipt of either final primary or secondary sampling results.

6.0 References

Environmental Strategies Consulting LLC. 2006. PCB Characterization Report. GE Silicones, LLC Plant, Friendly, West Virginia. May 4.

Environmental Strategies Consulting LLC. 2005. PCB Characterization Workplan. Former Crompton Corporation Sistersville Facility, Friendly, West Virginia. November 15.

ENVIRON International Corporation. 2005. PCB Characterization, August 2005. Memorandum from James S. Young, ENVIRON to GE Advanced Materials. September 27.

ENVIRON International Corporation. 2004. Phase II Investigation (Former Crompton Corporation/OSi Plant Sistersville, West Virginia). May.

Figures

Appendix A – Environmental Strategies Standard Operating Procedures

ENVIRONMENTAL STRATEGIES

STANDARD OPERATING FIELD PROCEDURES

Standard Operating Field Procedures

Table of Contents

Standard Operating Procedure – 1

Note Taking and Log Book Entries

Materials:

Permanently bound log book (no spiral-bound log books)
Black or blue ballpoint pen (waterproof ink)

Procedure:

1. Use black or blue ballpoint pen with waterproof ink. Felt-tip pens should not be used.

2. Reserve the inside front cover for business cards from key personnel who visit the site (including the person in charge of the log book).

3. On the first page of the log book, place a return for reward notice, Environmental Strategies' phone number, and the project manager's name.

4. Enter the following on the second page of the log book: project name, project number, project manager's name, onsite contacts, onsite telephone number and address, telephone numbers for all key personnel, and emergency fire and medical telephone numbers.

5. Number each page, initial each page, and put the date at the top of each page. Start a new page for each day. At the end of a day, summarize the day's activities, sign the page, and put a slash through the rest of the blank lines. Start the next day on a new page.

6. Enter the time (in military time, e.g., 0830) in the left column of each page when an entry is recorded in the field notebook.

7. If a mistake is made in an entry, cross out the mistake with one line and initial the end of the line.

8. At all times, maintain the chain of custody on the field log book.

Content:

1. Be sure that log book entries are LEGIBLE and contain accurate and inclusive documentation of project field activities.

2. Provide sufficient detail to enable others to reconstruct the activities observed.

3. Thoroughly describe all field activities while onsite. Be objective, factual, and thorough. Language should be free of personal feelings or other terminology that might prove inappropriate.

4. Describe problems, delays, and any unusual occurrences such as wrong equipment or breakdowns along with the resolutions and recommendations that resulted.

5. Fully document any deviations from or changes in the work plan.

6. Describe the weather and changes in the weather, particularly during sampling events.

7. Sketch a map of the facility or areas onsite where activities are occurring, especially the location of sampling points.

8. During sampling activities, record all information pertaining to the sampling event. Include descriptive locations and diagrams of the sample locations, time, sample media, analysis, sampling procedure, equipment used, sizes and types of containers, preservation and any resulting reactions, sampling identification (especially for duplicate samples), shipping procedures (record airbill numbers), and addresses.

9. Note decontamination or disposal procedures for all equipment, samples, and protective clothing and how effectively each is performed.

10. If possible, photograph all sample locations and areas of interest. Maintain a photographic log in the field log book and include:

    Date, time, photographer, name of site, general direction faced, description of the subject taken, and sequential number of the photograph and the roll number.

11. Record the names and affiliations of key personnel onsite each day.

12. List all field equipment used and record field measurements, including distances, monitoring and testing instrument readings (e.g., photoionization detector (PID), organic vapor analyzer (OVA), pH, conductivity, model numbers, etc.), and calibration activities.

13. Record proposed work schedules and changes in current schedules in the log book.

14. Describe site security measures.

15. Include drum inventory for all investigation-derived waste (IDW) materials generated during site activities. Provide information on how IDW material was labeled.

Standard Operating Procedure - 2

Sample Container, Preservatives, & Holding Times

Scope:

This operating procedure describes the ways and means of selecting the appropriate sampling containers for environmental sampling.

Application:

The purpose of this procedure is to assure that sample volumes and preservatives are sufficient for analytical services required under EPA-approved protocols.

Materials:

Sample containers
Sample container labels
Indelible (waterproof) markers or pens
Clear tape

Procedures:

1. Refer to Table 1 for minimum sample volume and glassware types required for sampling a particular matrix and compound class.

2. Select the appropriate glassware (i.e., bottles or jars) from those provided by the analytical laboratory. Verify that the analytical laboratory has provided the correct number of sample containers and the correct preservatives for the project per the sampling plan requirements.

3. The analytical laboratory should always provide extra sample containers for all analytical parameters in case of breakage or other problems encountered in the field. This is particularly true for VOC sample containers (i.e., 40-ml vials).

4. Report any discrepancies or non-receipt of specific types of sample containers to the Quality Assurance Officer immediately. Arrangements should be made with the laboratory to immediately ship the missing or additional sampling containers to the project site.

5. Apply Environmental Strategies sample labels to the sample containers.

6. Information on the sample labels should contain the following data:

   Site/Project name
   Project/Task number

Unique sample identification number
Sample date
Time of sample collection (military system, e.g., 0000 to 2400 hours)
Analytical parameters
Preservative
Sampling personnel

7. Once sample containers are properly labeled, the sample labels should be wrapped with clear tape to prevent deterioration of sample label.

8. Proceed with the sample collection per the sampling plan requirements.

9. Collected samples should be immediately placed in an iced cooler to maintain as close as possible a 4°C atmosphere for shipment to the analytical laboratory. Follow sample shipping procedures detailed in Sample Shipping Standard Operating Procedures.

10. Recommended order of sample collection:

In-situ measurements (e.g., temperature, pH, specific conductance)
Volatile organic analytes (VOA)
Purgeable organic carbon (POC)
Purgeable organic halogens (POX)
Total organic halogens (TOX)
Total organic carbon (TOC)
Extractable organics
Total petroleum hydrocarbons (TPH)
Total metals
Dissolved metals
Microbiologicals
Phenols
Cyanide
Sulfate and chloride
Turbidity
Nitrate and ammonia
Radionuclides

Table 1 – Sample Containers, Preservatives, and Holding Times

Analytical Parameter	Matrix	Sampling Container Size and Type	Preservatives	Maximum Holding Time
Metals, except mercury and hexavalent chromium	Solid	8-oz. glass jar	Cool to 4o C	180 days
Mercury	Solid	8-oz. glass jar	Cool to 4o C	28 days
Hexavalent chromium	Solid	8-oz. glass jar	Cool to 4o C	24 hours
Metals, except mercury and hexavalent chromium	Aqueous	500-ml plastic container with Teflon-lined plastic cap	HNO3, pH<2 Cool to 4o C	180 days
Mercury	Aqueous	500-ml plastic container with Teflon-lined plastic cap	HNO3, pH<2 Cool to 4o C	28 days
Hexavalent chromium	Aqueous	500-ml plastic container with Teflon-lined plastic cap	Cool to 4o C	24 hours
Volatile organics	Solid	4-oz. glass jar with Teflon-lined cap	Cool to 4o C	14 days
Volatile organics	Aqueous	Three 40-ml glass vials with Teflon-lined caps	HCl, pH<2 Cool to 4o C	14 days

Analytical Parameter	Matrix	Sampling Container Size and Type	Preservatives	Maximum Holding Time
Semivolatile organics	Solid	8-oz. amber glass jar with Teflon-lined cap	Cool to 4o C	14 days to extraction 40 days from extraction to analysis
Semivolatile organics	Aqueous	Two 1,000-ml amber glass jars with Teflon-lined caps	Cool to 4o C	7 days to extraction 40 days from extraction to analysis
Cyanide	Solid	8-oz. glass jar	Cool to 4o C	14 days
Cyanide	Aqueous	One 500-ml plastic Container	NaOH, pH>12, Cool to 4o C	14 days
TCLP Volatiles	Solid	8-oz. glass jar with Teflon-lined cap	Cool to 4o C	14 days to TCLP extraction 14 days from extraction to analysis
TCLP Semivolatile Organics	Solid	8-oz. glass jar	Cool to 4o C	14 days for TCLP extraction 7 days for preparative extraction 40 days from extraction to analysis
TCLP Metals, except Mercury	Solid	8-oz. glass jar	Cool to 4o C	180 days for TCLP extraction 180 days from preparative extraction to analysis

Analytical Parameter	Matrix	Sampling Container Size and Type	Preservatives	Maximum Holding Time
TCLP Mercury	Solid	8-oz. glass jar	Cool to 4o C	28 days for TCLP extraction 28 days from preparative extraction to analysis
Total Petroleum Hydrocarbons	Solid	4-oz. glass jar with Teflon-lined cap	Cool to 4o C	14 days for extraction 40 days for analysis
Total Petroleum Hydrocarbons (EPA Method 418.1)	Aqueous	1-liter amber glass jar	Cool to 4o C	14 days for extraction 40 days for analysis
Total Petroleum Hydrocarbons (EPA Method 8015 GRO)	Aqueous	2 40-ml glass vials	Cool to 4o C	14 days for extraction 40 days for analysis
Total Petroleum Hydrocarbons (EPA Method 8015 DRO)	Aqueous	2 40-ml glass vials	Cool to 4o C	14 days for extraction 40 days for analysis

Standard Operating Procedure – 9

Soil Sampling Using Bucket Auger

Materials:

Field log book
Personal protective equipment (PPE)
Bucket augers
Auger extension rods
Auger handle
Pipe wrenches (for threaded connections)
Push pins (for snap connections)
Stainless steel spoons or trowels
Mixing tray or bowl
Plastic sheeting
Expanding ruler or tape measure

Note: Decontamination is not required for dedicated sampling equipment.

Procedure:

1. Use appropriate PPE as specified in the site-specific health and safety plan.

2. Remove all vegetation or other surface material (e.g., gravel) with a hand trowel or other tool (e.g., shovel).

3. Advance the borehole to the desired sampling depth (i.e., the top of the sample interval). Attach a decontaminated auger bucket to collect the soil sample.

4. Place the auger bucket in the borehole. Grip the cross-handle with both hands and twist it clockwise to advance the auger.

5. Withdraw the auger bucket from the borehole and place it on plastic sheeting. For VOC samples, use a decontaminated stainless steel spoon or trowel to transfer the sample material directly into the appropriate sample container. A closed-system sampler (e.g., Encore Sampler) should be used, if necessary, to collect sludge samples for VOC analysis using EPA Method 5035 for preservation.

6. Remove the retrieved soil from the bucket with a decontaminated stainless steel spoon or trowel and place the material in a decontaminated mixing tray or bowl. If additional soil is needed to provide sufficient sample volume, repeat Step 4.

7. If necessary, screen the lead end of the auger with a PID/OVA or perform headspace analysis in accordance with SOP 22. Record the reading in the field logbook.

8. Describe the remaining sample material in accordance with American Society of Testing and Materials (ASTM) Standard D 2488 and the Unified Soil Classification System. Record the sample description in the field logbook.

9. For all other parameters, the sample material should be transferred into a decontaminated mixing tray or bowl. Use the stainless steel spoon to separate large clumps of soil material and mix the contents of the tray to a homogeneous particle size and texture.

10. Examine the contents of the tray and remove coarse gravel, organic material (e.g., roots, grass, and woody material) and any other debris with the stainless steel spoon.

11. Transfer the tray contents to the appropriate sample container using a stainless steel spoon.

12. Label the containers, cover the labels with tape, and immediately place the containers in a cooler maintained at an ambient temperature of 4° Celsius with wet ice. Freezer packs or dry ice should not be used for sample preservation.

13. Measure and record the sample depth in the field logbook, along with the sample location, sampler name, and the requested analytical parameters.

14. Complete the chain-of-custody form with appropriate sampling information.

15. Samples should be maintained and shipped in accordance with SOP 20.

16. Properly manage all PPE and investigation-derived wastes in accordance with state and federal requirements.

Standard Operating Procedure - 19

Decontamination of Sampling Equipment

Materials:

Field logbook
Personal protective equipment (PPE)
Deionized water
10% nitric acid solution
Nylon brushes
Containers (e.g., garbage cans, buckets, plastic tubs)
Nonphosphate detergent (e.g., Liquinox or Alconox)
Isopropanol
Aluminum foil
Polyethylene sheeting
Plastic garbage bags
Paper towels
Spray bottles
Duct tape

Note: All sampling equipment must be decontaminated before shipment to the office.

Decontamination Procedure:

1. Use appropriate PPE as specified in the site-specific health and safety plan.

2. Prepare a decontamination area by spreading polyethylene sheeting on a firm, flat surface (if possible). Create a berm around the decontamination area to contain inadvertent spillage. A berm can be created by rolling under the edges of the polysheeting or by draping the plastic over a wooden frame, etc.

3. Prepare a solution of nonphosphate detergent and tap water in a container.

4. Wipe sampling equipment with paper towels to remove residual soil or gross contamination. Heavy oils or grease may be removed with paper towels soaked with isopropanol.

5. Disassemble sampling equipment (e.g., split-spoon samplers and bailers). Wash equipment thoroughly in a nonphosphate detergent and hot tap water (if available) solution. Teflon bailers must be disassembled and the inside washed with a long-handled bottle brush or short-handled brush pulled through the bailer with rope.

6. Rinse the equipment with hot tap water (if available).

7. If the equipment will be used to collect samples for metals analysis, follow the tap water rinse with a 10% nitric acid solution rinse. Carbon steel equipment (e.g., bucket augers, split-spoons) should be rinsed with 1% nitric acid solution to reduce the potential for oxidizing the metal surfaces. Collect the nitric acid rinse in a separate bucket for proper disposal. Rinse the equipment with tap water.

8. Thoroughly rinse the equipment with deionized water.

9. Spray the equipment with isopropanol and allow to completely air dry. The solvent rinse must be collected in a separate bucket. Isopropanol is the recommended solvent for organic contaminants because it is readily available and is not a Department of Transportation hazardous material. However, other solvents (e.g., acetone, hexane, methanol) may be more effective in removing certain contaminants, such as oils or PCBs. Please note that many state programs and USEPA regions specify the solvents to be used for equipment decontamination.

10. Rinse the equipment with deionized water using at least five times the volume of solvent used in the previous step.

11. After the equipment has been allowed to completely air dry, each piece must be individually wrapped with aluminum foil (shiny side out), and then wrapped in plastic. **Note: Decontamination solvents may introduce contaminants to environmental samples. It is very important to ensure that the equipment has completely dried before use or storage.**

12. After the final decontamination event on a project, label each piece of equipment with the date of decontamination, the initials of decontamination personnel, and the type of decontamination solutions used.

13. Note any discrepancies from standard decontamination procedures in the field logbook.

14. Field decontamination presents unique problems in disposal of decontamination solutions. The spent wash water and rinse water can potentially be placed in the facility's waste water treatment system. However, field personnel should obtain approval from facility personnel and from the local POTW. If no wastewater treatment system is present onsite, or if approval cannot be obtained from the facility and local POTW, the wash water should be containerized for offsite disposal in accordance with state and federal requirements. The volume of spent solvent generated during field decontamination should be minimal. Solvents should be collected in separate buckets and allowed to evaporate. See SOP 26 for information on managing investigation-derived wastes.

15. Paper towels soaked with solvent should be allowed to air dry and be disposed of with the general trash. Under no circumstances should any decontamination solution be disposed of on soil surfaces.

Standard Operating Procedure – 20

Sample Shipping Procedures

Materials:

Sturdy plastic or metal ice cooler
Chain-of-custody forms
Custody seals
ESC mailing labels
Strapping, clear packing, and duct tape
Ziploc® plastic bags
Knife or scissors
Tape and dispenser
Extra labels, custody seals
Permanent marker
Surgical gloves or nitrile gloves (only for hazardous waste)
Large plastic bag (garbage can size)
Arrow labels or "This End Up" labels
Wet ice
Bubble wrap or other packing material
Universal sorbent materials
Sample container seals
Federal Express form (with ESC account number)
Vermiculite (or commercially available cat litter)

Procedures:

For shipping purposes, samples are segregated into two classes; environmental samples and restricted articles (i.e., hazardous materials). Environmental samples can also be categorized based on expected or historical analyte levels (i.e., low or high). An environmental sample is one that is not defined as a hazardous material by the Department of Transportation (DOT, 49 CFR Part 171.8). The DOT defines a "hazardous material" as a substance which has been determined by the Secretary of Transportation to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce, and which has been so designated. Any material of a suspected hazardous nature, previously characterized as hazardous, or known to be hazardous is considered a restricted article.

In general, the two major concerns in shipping samples are protecting the samples from incidental breakage during shipment and complying with applicable DOT and courier requirements for restricted article shipments.

Protecting the samples from incidental breakage can be achieved by following "common sense." All samples should be packed in a manner that will not allow them to freely move about in the cooler or shipping container. Glass surfaces should not be allowed to contact each other. When possible, repack the samples in the same materials that they were originally received in from the

laboratory. Each container should be cushioned with plastic bubble wrap, styrofoam, or other nonreactive cushioning material. Shipping hazardous materials should conform to the packaging, marking, labeling, and shipping instructions identified in 49 CFR Parts 172 & 173.

Environmental samples shall be packed for shipment using the following procedures:

1. Select a sturdy cooler in good condition. Secure and tape the drain plug with fiber tape. Line the cooler with a large, heavy-duty plastic bag. Place universal sorbent materials (e.g., sorbent pads) between the cooler and the heavy-duty plastic bag. If "wet ice" is used for sample preservation, then, the amount of sorbent material should be sufficient to absorb the volume of wet ice and samples.

2. Place 2-4 inches of bubble wrap or other packing material inside the heavy-duty plastic bag in the bottom of the cooler.

3. The sample packer should wear eye protection and protective gloves when handling the samples during the packing process.

4. After ensuring that sample container lids are closed and sealed, place the bottles in separate and appropriately sized Ziploc® polyethylene bags. Seal the bags with tape.

5. Wrap duplicate volatile organic (VOA) vials in one piece of bubble wrap or other packing material as a "VOA sandwich."

6. Place the bottles in the cooler with sufficient space to allow for the addition of more bubble wrap or other packing material between the bottles. Large or heavy sample containers should be placed on the bottom of the cooler with lighter samples (i.e., VOAs) placed on top to eliminate breakage.

7. Place the "wet ice" (i.e., ice packs) inside two sealed heavy-duty polyethylene bags (i.e., Ziploc®) and package the bags of ice on top of or between the samples. Pack enough ice in the cooler to chill the samples during transit. If the cooler is shipped on a Friday or Saturday for Monday delivery, double the amount of ice placed in the cooler. Fill all remaining space with bubble wrap or other packing material. Securely close and seal with tape the top of the heavy-duty plastic bag.

8. Place chain-of-custody form (and, if applicable, CLP traffic reports) into Ziploc® plastic bag and affix to the cooler's inside lid, then close the cooler. Securely fasten the top of the cooler shut with fiber tape. Place two signed and dated chain-of-custody seals on the top and sides of the cooler so that the cooler cannot be opened without breaking the seals.

9. Once cooler is sealed, shake test cooler to make sure that there are no loose sample containers in the cooler. If loose samples are detected, open the cooler and repack the samples.

10. Using clear tape, affix a mailing label and ESC's return address to the top of the cooler.

11. Mark the cooler with "This End Up" and arrow labels that indicate the proper upward position of the cooler.

12. Ship samples via priority overnight express to the contracted analytical laboratory for next morning delivery. If applicable, check for Saturday delivery.

13. Declare value of samples on the shipping form for insurance purposes. Note this declared value should reflect the cost to recollect the samples.

14. Record the tracking numbers from the Federal Express forms in the field notebook. Also, retain the customer's copy of the Federal Express airbill.

Hazardous materials should be packed according to the above procedures with the following additions:

1. Place samples in individual Ziploc® plastic bags and secure with a plastic tie.

2. Place samples in paint cans in a manner which would prevent bottle breakage (i.e., do not place glass against glass).

3. Place vermiculite or other absorbent packing material in the paint can around the samples. The amount of packing material used should be sufficient to absorb the entire contents of the sample if the container is broken during shipment.

4. Secure a lid to the paint can with can clips and label the outside of the can with sample numbers and quantity. Mark the paint can with "This End Up" and arrow labels that indicate the proper upward position of the paint can.

5. Package the paint cans in DOT boxes or coolers, with appropriate DOT shipping labels and markings on two adjacent sides of the box or cooler.

6. Ship the restricted articles via overnight courier following the courier's documentation requirements. A special airbill must be completed for each shipment. Retain a copy of the airbill for ESC records and tracking purposes, if necessary.

Standard Operating Procedure – 21

Field Quality Assurance/Quality Control Samples

Materials:

Field logbook
Personal protective equipment (PPE)
Sample containers
Sample labels
Clear tape
Laboratory analyte free water
Clean or dedicated sampling equipment

Procedure:

1. Use appropriate PPE as specified in the site-specific health and safety plan.

2. Select the appropriate glassware for the field Quality Assurance/Quality Control (QA/QC) samples. Refer to the Environmental Strategies Standard Operating Procedure for Sample Container, Preservatives, and Holding Times to determine the appropriate bottles to use.

3. Field QA/QC samples include the following:

   trip blanks
   duplicate samples
   equipment blanks

4. Trip blanks should be provided by the analytical laboratory for all projects where samples are being collected for analysis of volatile organic compounds (VOCs). Trip blanks should accompany the sample bottles from the analytical laboratory to the site, accompany the sample containers at all times during the sampling event, and return to the laboratory with the sample containers. One trip blank should be submitted to the analytical laboratory with each shipment containing samples for VOC analysis. The trip blank should be analyzed only for VOCs.

5. One duplicate sample should be collected for every 20 samples of each matrix (e.g., soil and groundwater) collected during each sampling event. Duplicate samples of soil and other solid matrices should be collected by dividing the sample material in half and alternately filling the two sample bottle sets. Duplicate samples of groundwater and other aqueous matrices should be collected by alternately filling the two sample bottle sets from the same sampling vessel (e.g., bailer). The appropriate SOP should be followed for the collection of each sample type (soil, groundwater, sediment, sludge). Duplicate samples should be analyzed for all the analytes that are being analyzed for during the sampling event.

6. One equipment blank should be collected in the field at a rate of one per type of equipment per decontamination event not to exceed one per day. If dedicated sampling equipment is used, the equipment blanks should be prepared in the field before sampling begins. If field decontamination of sampling equipment is required, the equipment blanks should be prepared after the equipment has been used and field-decontaminated at least once. Equipment blanks should be prepared by filling or rinsing the precleaned equipment with analyte-free water and collecting the rinsate in the appropriate sample containers. The samples should be labeled, preserved, and filtered (if required) in the same manner as the environmental samples. Equipment blanks should be analyzed for all the analytes for which the environmental samples are being analyzed. Decontamination of the equipment following equipment blank procurement is not required.

7. All QA/QC samples should be submitted to the analytical laboratory with unique sample numbers. Therefore, the QA/QC samples should be labeled as separate environmental samples following the same numbering scheme used during that particular sampling event. However, the QA/QC samples should be clearly identified on Environmental Strategies' copy of the chain-of-custody form and in the field logbook.

Standard Operating Procedure – 24

Soil Sampling Using GeoProbe® System or Equivalent

Application:

To perform depth-discrete soil sampling with 2-foot or 4-foot long samplers using hydraulically-driven soil sampling equipment (GeoProbe® System or Equivalent).

Materials:

Stainless steel soil sampler (2-foot or 4-foot long)
Clear acetate liners
Tape measure or expandable ruler
Utility knife
Photoionization detector (PID)
Stainless steel spoons
Aluminum tray or stainless steel mixing bowl[a]
Nitrile or latex gloves
Field notebook

Procedure:

1. Calibrate the PID in accordance to the manufacturers instructions. Decontaminate all down-hole sampling equipment and the utility knife, spoons, and mixing bowl per SOP 19 before initiating any boring activities. Ensure that the location is clear of all underground utilities and pipelines.

2. Attach a decontaminated 2-foot or 4-foot long stainless steel sampler fitted with a new, clear acetate liner and a decontaminated removable cutting shoe to small-diameter rods. Lower the stainless steel sampler to the top of the desired sampling depth.

3. Advance the stainless steel sampler through the desired sample interval. Record in the dedicated field notebook the interval through which the sampler was pushed.

4. After the sampler has reached the desired depth, retrieve the sampler by first removing the rods and then disconnecting the sampler. Remove the cutting shoe and acetate liner containing the soil column from the sampler. Measure the length of the material recovered relative to the interval the sampler was advanced, and record this information in the field notebook.

5. Cut the acetate liner using a utility knife to expose the recovered soil. Quickly scan the recovered soil with the PID and if necessary, immediately collect samples for VOC analysis. If the plan indicates the collection of samples for headspace analysis, collect this sample after obtaining the sample for VOC analysis per SOP 22. Record the PID readings in the field notebook.

6. For VOC samples, transfer soil directly from the acetate liner into the sample containers with a clean, stainless steel spoon. Fill the VOC sample container with a representative sample from the entire length of the recovered sample core, or other designated sample interval[a]. Fill the VOC container completely, leaving no headspace.

7. Describe the recovered soil using the Unified Soil Classification System or standard geological descriptions. Record the sample description in the field notebook.

8. If it is necessary to mix the sample, transfer the soil from the acetate liner to a clean aluminum tray or decontaminated stainless steel mixing bowl with a decontaminated stainless steel spoon[b].

9. Examine contents of the tray/bowl and remove rock fragments and organic debris, such as roots, grass, and woody material, with the stainless steel spoon. Use the same spoon to chop apart clumps of dirt and mix the contents of the tray to a homogeneous particle size and soil texture. Transfer the tray/bowl contents to the appropriate sample containers using the stainless steel spoon.

10. The sample container(s) should be sealed, labeled, and placed in a cooler with ice or freezer packs to maintain 4° Celsius for shipment to the analytical laboratory.

11. Complete the chain-of-custody form with the appropriate sampling information.

    a. *NJDEP's Field Sampling Procedures Manual requires the collection of soil samples for VOC analysis from the 0.5-foot interval that exhibits the highest reading during the field (PID) screening.*

    b. *U.S. Environmental Protection Agency (EPA) Region 4 requires a glass bowl for homogenizing soil for sample collection.*